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A CENTURY OF PATENT LAW.

AMONG the powers conferred upon Congress by the Constitution is the power "to promote the progress of science and useful arts, by securing for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries." Under this power, Congress on the tenth day of April, 1790, enacted a statute entitled "An Act to promote the progress of useful arts," which was the beginning of the patent legislation of the United States. During the century which has elapsed since the passage of this act there has been in force in this country a body of statutes which are spoken of collectively as the Patent Law. Numerous cases have arisen and been brought before the courts of the United States calling for the interpretation of these statutes. It is a fitting time to inquire into the results of the legislation and judicial decisions which owe their existence to the power of Congress to promote the progress of useful arts. Have these results justified the grant of the power and its exercise by Congress?

The act of 1790 specified the subjects for which patents might be granted as the invention or discovery "of any useful art, manufacture, engine, machine or device, or any improvement thereon not before known." This enumeration of the subjects of invention has not been materially changed, the language of the statute now in force being "any new and useful art, machine, manufacture, or composition of matter" or improvement thereof. Under the English Statute of Monopolies, all subjects of invention had been embraced in the simpler phrase "any manner of new manufacture." Applications for patents under the act of 1790 were made to the Secretary of State, the

Secretary of War, and the Attorney-General; and they or any two of them were to decide upon the issue of the patent.

The right secured by a patent was the "sole and exclusive right and liberty of making, constructing, using, and vending to others to be used," for a term not exceeding fourteen years, the invention or discovery. The patentee was required to furnish a description in writing of the invention, with models to illustrate it where the nature of the invention admitted of a model. The sixth section of the act contained a further provision, which distinguished our law from the English law and which has proved of great value to inventors. The patent was made *prima facie* evidence in any suit that the patentee was the first inventor and that the invention was truly described. In England the burden of proof, when these facts are put in issue, was upon the plaintiff; and it was not always easy to furnish the evidence required. Under the act of 1790, if these facts were denied by a defendant, the burden of proof was upon him to establish his denial; and the shifting of the burden of proof made it much easier for a patentee to enforce his rights. This provision of the act of 1790 has remained a part of our patent law to the present time. Models have not been required for many years. The act contained no limitation of its benefits to citizens or residents of this country, but in terms provided that "any person" who had made an invention or discovery, such as was specified, might receive a patent,—a feature of the law which is interesting in connection with subsequent legislation.

The act was approved April 10, 1790. The first patent granted under it was dated July 31 of the same year, for making pot and pearl ashes; and only two more patents were granted during the year. It continued in force until February 21, 1793, and only fifty-five patents were granted under it. One of these—the first in a long

series of inventions not yet ended — was to John Fitch for propelling vessels by steam, an invention which has proved to be of incalculable value to this country and to the world. Such was the beginning of the history of the patent law of this country.

On February 21, 1793, another act took the place of that of 1790, but made no important change in the requirements imposed upon inventors as a condition for the grant of a patent or in the rights secured to them, except that the benefits of the law were limited to citizens of the United States. The administration of the law as to the issue of patents was committed to the Secretary of State and the Attorney-General. An applicant for a patent was required to make oath that he believed himself to be the true inventor. An act of April 17, 1800, extended the right to take patents to aliens who at the time of petitioning had resided for more than two years within the United States. The right to secure a patent was also extended to the legal representatives of an inventor who had died before a patent was issued to him.

An important change in the mode of administering and enforcing the patent law was introduced by an act of February 15, 1819, giving to the Circuit Courts of the United States jurisdiction in equity of actions for the infringement of patents, with power to grant injunctions to prevent the violation of the rights of inventors. No other provision for the protection of the rights secured by patents has been so effectual as this power to restrain infringements by injunction. It is constantly invoked, and without it the courts could not practically secure to inventors the exclusive right to their inventions which is contemplated by the Constitution. With the exception of a provision in an act of 1832, recognizing a practice, already established, of reissuing patents to correct mistakes, no other important change was made in the patent law before the repeal, on July 4, 1836, of all pre-

vious acts and the inauguration of a new system for the grant of patents.

During the period of a little more than forty-six years after the enactment of the first law in 1790, the number of patents granted, exclusive of reissues, was 9,957,—a number now exceeded in a period of six months. The highest number granted in one year under the act of 1793 was 751, in the year 1835. Early in the list of patents granted under the act of 1793 was the memorable one granted to Eli Whitney, March 4, 1794, for a machine for ginning cotton. Another notable invention was patented three years later by Amos Whittemore for "improvement in manufacturing wool cards." A patent was granted to Thomas Perkins in February, 1794, for manufacturing nails; and within three years twelve more patents were granted relating to the same manufacture. Among the patents of 1796 is one to Elisha Perkins for removing pains by metallic points, probably the devices which became notorious as "Perkins Tractors." The whole number of patents issued before 1800 was 256, a little more than one-half the number now issued weekly. The number issued in the last ten years, from 1880 to 1890, was 195,454, or more than eight hundred times the number during the first ten years of the patent law.

The act of 1836 introduced a radical change in the patent law, so far as it related to the grant of patents. It created an office, attached to the Department of State, to be called the Patent Office. The office has since been attached to the Department of the Interior. The first section provided for the appointment of a Commissioner of Patents, who was to have charge of the office, and was required to superintend and perform all duties touching the granting of patents. The conditions under which an applicant was to be entitled to a patent were substantially the same as under the act of 1793, and foreigners were placed on the same footing as citizens except as to the amount of the fees to be paid.

The term for which patents were granted was, as under the previous acts, fourteen years; but an important innovation was introduced in favor of patentees. Provision was made for the extension of a patent, upon the expiration of the term for which it was originally granted, for a further term of seven years, if upon a hearing before a board consisting of the Secretary of State, the Commissioner of Patents, and the Solicitor of the Treasury, it should be made to appear that a patentee had failed, without neglect or fault on his part, to obtain a reasonable remuneration for the time, ingenuity, and expense bestowed upon the invention, having due regard to the public interest. By an act in 1848, the power to extend patents was conferred solely on the Commissioner of Patents. Under this provision, applications for the extension of valuable patents became very common. As the value of an invention to the public was assumed to be indicated by the extent to which it had been used, the curious result followed, in many cases, that the receipt of a large sum by a patentee from his invention became evidence of its great value, and so became a reason for granting an extension rather than for refusing it. Especially was this the case when, as often happened, the inventor had sold the invention before its value was established, and the profits of it had been secured by assignees. As the invention was to be for the benefit of the inventor and not for that of assignees, it was necessary for him to have the title to the invention in order to secure the extension. If he had parted not only with the original term of the patent, but with any extensions of it which might be granted, it became necessary for him and his assignees to make some arrangements to give him a valuable interest in the extended term. The result, therefore, was that the assignee often secured a large share of the benefits of the extension. If, on the other hand, the inventor had granted no interest in the extended term, and an exten-

sion would inure wholly to his benefit, it would generally be for the interest of assignees to oppose an extension; and thus it often became necessary for an inventor to silence their opposition by some arrangement, giving them an interest in the extended term. The inventor, therefore, often failed to receive the whole benefit of an extension. It was often the case that he received very little.

It can be easily seen that the interest of the public was opposed to extensions. The evidence which was laid before the Patent Office in investigations as to the value of particular inventions was by no means the *ex parte* testimony of interested parties: for the law required the fact of an application for the extension of a patent to be published in one or more of the principal newspapers in Washington and in such other papers as the Commissioner might deem proper in the section of the country most interested adversely to the extension of the patent; and further provided that any person might contest the extension. In fact, many of the applications for the extension of patents were vigorously contested. It was abundantly established by these investigations that the most fortunate inventors received as the fruit of their invention but a small part of the value of the invention to the public. But it appeared in many cases that this small part amounted to a large sum. Elias Howe was compelled to admit, when he applied for an extension of his patent on the sewing machine, that there had been received from the invention several hundred thousand dollars, a large part of which was profit. But, as he was able to show that the value of the invention to the public reached many millions of dollars, it was deemed right to give him an extension. Many people could only see what the inventor had received, and were blind to the advantages gained by the public, and a very strong feeling of opposition to the extension of patents was developed, which resulted in 1861 in a change of the law. All patents thereafter

granted were to be for the term of seventeen years, and all extensions were prohibited.

Another important feature of the patent law introduced by the act of 1836 was the provision for the registration in the Patent Office of assignments of patents, and of grants of exclusive rights to an invention in specified territories. This change gave a security to the title to a patent similar to that given to the title to land by a registration of deeds, and served to prevent much expensive litigation.

But unquestionably the most important change introduced by the act of 1836, by the establishment of the Patent Office under the charge of a Commissioner of Patents, was the power given the Commissioner to decide whether an applicant was entitled to a patent under the provisions of the statute. In the discharge of this duty, it was incumbent upon him, on an application by an inventor for a patent, to make or cause to be made an examination of the new invention; and if on such examination it should appear to him that the invention had not before been made in this country, or that it had not been anywhere patented or described in a printed publication, and had not been in public use or on sale with the applicant's consent or allowance prior to the application, he should, if he deemed it sufficiently important and useful, issue a patent therefor. No such examination, to be made previous to the issue of a patent, had been called for by the act of 1793 or by the law of any other country. It has proved to be one of the most valuable and important features of the patent system, and in one form or another has been provided for by many, if not all, the nations which grant patents for inventions. Under the act of 1793, a patent was granted to an applicant upon his allegation that he had made an invention not known or used before. If he was mistaken in this allegation, his patent was void. But it is obvious that in most cases it would be impossible for an inventor to know, with certainty,

what had been done before ; and the expense of an examination of the state of the art would be too great for most, if not all, inventors. Without such an examination, no purchaser of a patent could feel any assurance that the patent would not prove to have been anticipated. But under the act of 1836 it was made the duty of the Commissioner of Patents to do for an inventor what he could not in most cases do for himself. He was to cause an examination to be made ; and upon the result of that examination the issue of the patent depended. The cost of the examination was covered by a fee of thirty dollars, which the applicant was required to pay. To provide facilities for the examinations, the act provided for the establishment of a library of scientific books, and appropriated fifteen hundred dollars for its acquisition. That library has grown to more than fifty-four thousand volumes.

It is true that the examination thus provided for was not to be conclusive, and a patent might be found to be invalid notwithstanding the examination. A defendant in a suit has a right to show, and often does show, that a patent is void for want of novelty. But, though the examination is not conclusive and binding upon other persons, it is valuable both to inventors and the public. The records of the Patent Office show that nearly one-half of the applications during the past year were rejected. Under the old practice, patents would have issued on all these rejected applications, without benefit to the inventor and to the annoyance of the public. Moreover, the provision for an examination of applications for patents has served to strengthen the presumption in favor of the validity of a patent which arises from the oath of the inventor. The strong presumption which the examination furnishes gives a value to a patent, from the moment of its issue, which it could not otherwise have, and increases the security of the investment of money in it. Very few inven-

tions can be made profitable without an outlay which cannot be justified or secured except upon a reasonable confidence in the validity of the patents which have been granted for them. The examinations of the Patent Office, though not conclusive and often not exhaustive, do furnish an assurance of the novelty of the inventions, which in most cases is of great value. The usefulness of this feature of our patent system is indicated by the fact of its adoption by other nations.

Another important duty imposed upon the Patent Office by the act of 1836 was the power to investigate the several claims of two or more inventors to the same invention, and decide which was the first inventor. Cases of this kind, known as interference cases, often arise. Provision is made for their trial similar to that made for the trial of cases in courts. They come in the first instance before an officer known as the Examiner in Interferences. Testimony is taken by the respective parties, as in equity cases; and arguments are made in behalf of the parties, as in trials before courts. An appeal lies from the judgment of the Examiner in Interferences to a Board of three Examiners in Chief, and from them in turn to the Commissioner in person. These controversies arise not only when two or more applications are before the office at the same time, but between an applicant and a party to whom a patent has been issued. The first inventor cannot be deprived of his patent by reason of a grant of a patent to another person for the same invention. The Commissioner, it is true, cannot revoke a patent improperly issued to one who was not the first inventor. He can only give a patent to one who is shown in an interference proceeding to be the first inventor, and leave it to the courts to decide the patent to a second inventor, if he attempts to enforce it, to be invalid.

The act of 1836 was followed in 1837 by another act, which introduced two important features to relieve pat-

entees from the consequences of mistakes in drawing up their specifications and claims. Under the law up to that time a patent was invalid, if it claimed more than the patentee was entitled to claim. If void as to any part, it was void altogether. The patentee was made responsible for all his patent contained. The theory was that the patent was granted upon the representations of the patentee, and that, if those representations were in fact untrue, the patent was obtained upon a false representation, and should therefore be held void. Yet it is easy to see that an applicant for a patent might honestly believe that he was the first inventor, and therefore claim something which had been before invented by another person. It was manifestly a hardship for an inventor to be held responsible for the truth of all that he believed to be true, and to compel him to forfeit what he had in fact invented, because he believed he had invented more. The act of 1837 relieved him from this hardship, and made him responsible for good faith only. It provided in its seventh section that, if a patentee through inadvertence, accident, or mistake had made his claim too broad, by claiming something of which he was not in fact the first inventor, some part, however, being justly his own, he might make disclaimer of that of which he was not the inventor, and such disclaimer should stand thereafter as part of the original specification. By the ninth section it was provided that a patent should be deemed good for all the inventor was entitled to claim, even though no disclaimer had been made, unless the patentee unreasonably failed to make proper disclaimer. These two provisions greatly increased the security and value of patent property. Their manifest purpose was to secure to an inventor all that he had really invented, unless he had forfeited by bad faith every claim to consideration.

Another most important change in the patent law was introduced by an act of 1839. Under the act of 1793, an

inventor lost his right to a patent, if the invention had been known and used by others before he made his application. To avoid the risk of having his invention put into use by some one else, and thus losing it, he was compelled to make his experiments and trials in secret. This it was often impossible for him to do. The act of 1836 had relieved him from the liability to loss from the use of the invention by others, unless it was by his own consent and allowance. He was responsible for his own acts, but not for the acts of others without his consent. But it is often very important for an inventor to subject his invention to trial under the conditions which will completely test its perfection, and expose any defects which may require to be remedied. In most cases, this can be done satisfactorily only by the actual use of the invention under normal conditions. To give an inventor the opportunity to test his invention by actual use, without the risk of losing his right to a patent, the act of 1839 provided that no use of an invention by the public, either with or without the consent of the inventor, should impair his right to a patent unless the use had been for more than two years, or upon proof of abandonment. In one respect this enlarged the rights of an inventor, in another respect it narrowed them. It gave him the privilege to permit the use of his invention or sell the right to use it without losing the right to a patent, if the use or sale had not been for more than two years; but, if he delayed his application for more than two years after the completion of the invention, it subjected him to the liability to lose his right, if the sale or use had been for more than two years, even without his knowledge or consent.

The act of 1836, with the amendments of 1837 and 1839, virtually determined the character of the patent law as it exists to-day. With the exception of the changes in 1861, already referred to, by which the term of a patent was extended from fourteen years to seventeen, and the

right to an extension abolished, no change has been made in the law which could seriously affect its influence upon inventors in stimulating them to make inventions, or upon capitalists in making investments in them. There was a general revision of the patent law in 1870, in the nature of a codification of the statutes then in force; but no substantial change was made in the rights of inventors, in the proceedings touching the issue of patents, or in the practice or jurisdiction of the courts in administering the law. In the general revision of the laws of the United States in 1875, some slight changes in the language of the act of 1870 were made, to render it more explicit in some cases; but nothing more. Practically, the law now stands as it was left in 1870.

The growth of the Patent Office and of its business since its establishment in 1836 are of the highest interest and importance. The records of the office contain the history of the inventions of the country and its advancement in the industrial arts. It would be difficult, if not wholly impossible, to point to any marked improvement in the physical arts the evidence of which will not be found in those records.

Under the act of 1836, the office consisted of the Commissioner of Patents, with a salary of three thousand dollars; a chief clerk, with a salary of seventeen hundred dollars; an examining clerk, three other clerks, one of whom was to be a competent draughtsman, a machinist, and a messenger. Eight persons made up the force of the office, and the aggregate of their salaries was eleven thousand five hundred and fifty dollars. The expenses of the office for the first full year, 1837, were \$33,506.98, and the receipts \$29,289.08. The number of patents issued by the office in 1836 after the date of the act establishing it (July 4) was 109; and the number for the first full year, 1837, was 436. Such was the beginning of the Patent Office. Its growth has been marvellous, and

indicates in the most striking manner the mental capacity and energy to be found among the laboring men of the country; for it cannot be disputed that the greater part of the inventions come from those who are properly called laboring men. In 1889 the force of the office consisted of the Commissioner of Patents, an Assistant Commissioner, a Chief Clerk, a Law Clerk, three Examiners in Chief, one Examiner in Interferences, thirty Examiners, and one hundred and fifty-three Assistant Examiners: the whole number of persons employed was over five hundred and sixty. The receipts of the office were \$1,281,728.05, and the expenses \$1,052,955.98, leaving a net surplus of \$228,772.07. The number of applications for patents for inventions was 39,607; for designs, 859; for reissues, 111. The whole number of patents granted to inventors was 24,083, 22,080 to citizens and 2,003 to foreigners. In fifty-four years, the number of patents increased more than fifty-five-fold, the receipts more than forty-fold, the expenses more than thirty-two-fold, and the number of persons employed seventy-fold. The number of patents granted in forty-six years, prior to July 4, 1836, was 9,957: the number granted since that date to July 4, 1890, was 431,541.

The specifications of all patents are now printed, and copies are furnished to any one on payment of a fee not exceeding twenty-five cents. The examination of patents is thus made easy to inventors and others who may be interested in any line of invention. The office publishes a gazette of the patents issued the preceding week, containing the claims in full and the drawings in whole or in part. From the subscriptions for this publication the office received last year over thirteen thousand dollars. In connection with the business of the Patent Office there has grown up a class of men known as patent solicitors, whose business is the procuring of patents, and who may fairly be regarded as a part of the patent system. A con-

siderable number of lawyers devote themselves to patent business exclusively.

To facilitate the examination of applications, inventions are divided in the office into 188 classes, a greater or less number of which are assigned to each examiner. These classes again are divided into more than 4,000 sub-classes. Thus sewing machines, which have come into existence since the Patent Office itself was established, constitute a class divided into 42 sub-classes, the subjects of which were unknown before the advent of the sewing machine, less than fifty years ago. The examination of the list of these 188 classes and their sub-classes shows that every field of human industry is explored by the inventors of our country and subjected to their efforts to improve whatever lies within their reach. No problem is so difficult as to prevent them from attempting its solution, and none so small as to escape their observation. Nothing is so good that they will not attempt to make it better; nothing so cheap that they will not strive to make it cheaper. They are satisfied with nothing, and will let nothing rest as it is. To make improvements has become a passion which nothing will satisfy but incessant activity.

If the granting of patents is of itself the end to be secured by the patent law, we have in the foregoing figures abundant evidence to justify the existence of the law. It is safe to assert that in no other century has there been made by the whole world such a number of useful inventions as are represented by the 441,498 patents issued in this country alone in one hundred years, to July 4, 1890. But turning aside from mere numbers, and considering only the intrinsic value of inventions, their contributions to the welfare of men, their effect upon the industries and the social condition of men, we may safely challenge the world to show in any century of its history before 1790 any such number of useful inventions as it has received since that time through patents granted

by the United States. Through the patent granted to Eli Whitney, it received at the commencement of the century the cotton gin, which has probably contributed more to the comfort of man as to clothing than any single advance in the arts since spinning and weaving were invented. This was followed by the sewing machine, and this again by the vulcanization of rubber, accompanied by numerous important improvements in spinning, weaving, and knitting machinery, and in machinery for making hats, caps, and boots and shoes,—all relating to the clothing of man. Through the Patent Office, the world also obtained the steamboat, the planing machine, the machine for turning irregular forms, the Morse electric telegraph, the telephone, the reaping machine and mower, nail-making machines, screw machines, and the steam drill and steam dredge, which have increased a thousand-fold the ability of men to execute engineering enterprises. This is by no means an exhaustive list of radically new inventions, given to the world through our Patent Office, which have worked revolutions in its industries.

Are these results of the work of the Patent Office conclusive as to the value of the patent system, or do they leave open the inquiry as to its benefits to the country? There are those who assert that the patent law is no advantage to the country. It is undeniable that there has been, and doubtless still is in some parts of the country, a wide-spread hostility to the patent law. This feeling was, not many years since, very prevalent among the farmers at the West, and may still be so, though they are a class to whom the inventions of recent years have been of incalculable value. It may have been entertained and stimulated by the railroad companies, which have found it inconvenient to dispense with or pay for patented inventions. The writer was assured several years ago, by a member of Congress from Massachusetts, that a large number of the members of the House of Representatives

were ready at any moment to vote for the repeal of the patent law. At every session of Congress bills are introduced, providing, if not for the repeal of the law, at least for its amendment in such a way as to destroy or impair the value of patent property.

Curiously enough, this hostility to the patent law is often excited by inventions of the greatest value. A striking instance of this was presented in the history of the driven well. That it was a valuable invention is proved by the wide extent of its use. In many parts of the country, the difficulty and cost of digging wells were so great that, when it became known, its adoption by multitudes was certain. It was cheap and effective. It was so simple that to most persons it did not seem to involve invention. It consisted of an iron tube provided with a solid point and with holes at the bottom of the tube for the entrance of water. This tube was driven into the ground till it reached water; and, with a pump attached to the upper end in the usual way, water could be sucked out of the ground. Multitudes of farmers bought these instruments, and used them without knowledge of the existence of a patent. The patent became the property of a company which sought to enforce it. Its validity was contested on various grounds, but unsuccessfully at first. Armed with the decisions of the courts in its favor, the company sought to enforce its rights against the numerous users in various parts of the country by collecting damages or obtaining injunctions. But the number of infringers was so great, and they were so widely spread over certain parts of the country, that it was difficult to reach them. Unfortunately, the company adopted the policy of farming out the collection of damages to local agents in the regions of infringements, who were to receive a commission on the amounts collected. These agents hunted up the infringers and issued notices to them to pay a sum fixed as a royalty (which does not

appear to have been exorbitant), accompanied with a threat that, if this was not done at once, the amount charged would be largely increased, and that a suit would be commenced to enforce the payment and to obtain an injunction. Large amounts are said to have been collected in this way. It was easier for a farmer to pay the sum demanded than to contest a suit, or even to consult counsel as to a defence. Nevertheless, he was made excessively angry; and, if he was surrounded by neighbors in the same situation, they easily brought themselves into a state of excitement which manifested itself in denunciations of the patent law to their representative in Congress, in the resolutions of political conventions, and in demands for its repeal. No thought was given to the fact that, even after paying the sum demanded, the infringer had obtained an efficient well at a trifling cost as compared with the cost of digging one in the old way.

A dramatic element of the history of the driven-well patent is that, after it had expired, it was declared invalid by the Supreme Court. All the money exacted under it from the users of driven-wells was illegally exacted. It may well be imagined that this final condemnation of the patent after it had expired was not calculated to dissipate the hostility of the Western farmers. The ground on which it was declared invalid was that the invention had been in public use more than two years before the inventor made his application for a patent. This fact did not appear in the earlier cases, and was not known to the Patent Office while the application was pending. But, if the fact had been known, the patent would undoubtedly have been issued by the Patent Office, and would have been sustained by the Circuit Courts; for the decision of the Supreme Court was based upon a construction of the statute of 1839, above referred to, different from that which had been given to it by the Circuit Courts and by patent lawyers generally of the country.

Other illustrations might be given of the hostility which is aroused against the patent law by attempts to enforce it. The determined hostility of the Southern planters to the enforcement of Whitney's rights under his patent for the cotton gin is a matter of history. The most common change which this feeling of the opponents of the patent law causes them to ask of Congress is the so-called innocent purchaser provision. It is proposed that any person who buys a patented article in the open market, without knowledge of the fact that it is patented, shall not be held liable as an infringer. It is easy to see that the purchaser of any article would take good care not to know that it was the subject of a patent. He would at least convince himself that the patent was invalid. In many other indirect ways, attempts are frequently made to impair the efficiency of the patent law. The writer is not aware that a bill has ever been introduced in Congress for its direct repeal.

One of the objections not infrequently made to a patent law, sometimes undoubtedly in good faith, is that it does not in fact stimulate inventions; that they are made because inventors are impelled by a spirit of invention which they can no more resist than they can resist the demands of hunger, and that it is therefore unwise and unjust to pay a bonus for their labors. It is said that the inventions which have been made under the stimulus of the patent law, or others as good, would have been made without it. It is obviously impossible to demonstrate absolutely the truth or the falsity of such an assertion. Multitudes of inventions were made by men before the world knew of a patent law. Patents for inventions are themselves a modern invention. They owe their origin to the English statute of monopolies passed in 1622. Many great inventions, which may even be called modern, were made before that time. The art of printing is a notable instance. The invention of gunpowder and fire-arms was not due to a pat-

ent law, nor the invention of the mariner's compass, nor the telescope. Even now the highest efforts of the human mind are directed to scientific discovery without thought of pecuniary reward. Upon what ground, then, can it be asserted that the patent law of this country has justified its existence; that it has fulfilled its mission "to promote the progress of science and useful arts"?

In the first place, it is an important fact that the inventors who have taken patents in the United States form such a host. This alone raises a presumption that they have not been indifferent to the hope of gain from their inventions. They have at least acted as though their inventions were made for the purpose of securing patents, and profits from them. In no other country has it been so easy and inexpensive for inventors to obtain patents for inventions, and in no other country have so many patents been granted annually or in the aggregate. England has had her patent law nearly three hundred years, and under it patents have been granted for some of the most important inventions the world has ever seen. This country, starting in 1790 with a population of less than four millions and with limited manufactures, has outstripped her in one hundred years. In England the cost of procuring patents has been high. In this country it has been low. The low cost of procuring patents in this country has placed them within the reach of thousands who could not have availed themselves of the right if the expense had been that of obtaining patents in England.

It is interesting to observe that this country was the first to follow the example of England in securing to inventors the exclusive right to their inventions. France followed a year later, and Germany in 1815. Since then the wisdom of securing to inventors a return for their labor has been so generally recognized that now nearly every civilized country, if not every one, has a patent law. The two thousand and three patents granted last year by

the Patent Office to foreign inventors were distributed among thirty-seven countries. The legislation of many of these countries has been based upon or copied from the law of this country. It is fair to conclude that the recognition of the value of the patent law to this country has had its influence in leading other countries to the belief that it was wise to invest inventors with a right to their inventions.

Next, we may note another interesting and important fact, which bears upon the question whether patent laws stimulate invention. The three countries which in this age of invention have contributed the greatest number of radically new and highly valuable inventions are the three countries which have longest secured to its inventors a right to their inventions,—England, the United States, and France.

But the agency of the patent law in promoting progress in the useful arts is not limited to its influence upon the inventor. It reaches the capitalist, who is generally as necessary to the introduction of an invention as the inventor himself. He has no motive to interest himself in a new invention but the hope of gain. He has no sentiment to gratify such as may inspire an inventor to surmount obstacles and achieve triumphs. Success with him is the credit side of profit and loss. But, with most important inventions, the investment and risking of capital in securing their introduction among the useful arts are indispensable. The share of Boulton, the partner of Watt, in the improvement and introduction of the steam-engine, was hardly less than that of Watt himself. Without his business experience and sagacity, as well as his capital, the world might have waited long for the results of Watt's genius. But it is matter of history that, after Boulton had become fully convinced of the great value of what had been done by Watt, he refused to devote himself and his capital to the introduction of the steam-engine until Watt,

whose patent had nearly expired during his fruitless efforts to secure aid, had secured from Parliament an extension of the patent. This episode in the history of the steam-engine illustrates a very important point in the effects of a patent law on the introduction of inventions and the progress of the useful arts. The introduction of new inventions is generally, if not always, attended with such expense and trouble and risk that few persons will attempt it unless they can be protected, after success is secured, from the competition of those who have had no part of that expense. It is only by giving to new inventions the status of property, the possession of which can be assured by law, that they can be bought and sold like other property; and, if they cannot be bought and sold, inventors can seldom or never find a recompense for what they have done. It is only through the patent law that inventions at the commencement of their history can usually acquire a marketable value; and, unless they can acquire such a value, they will seldom be called into existence. The testimony of all the leading inventors who have contributed to the material progress of the age, whenever it has been given, is uniformly that their inventions would never have been made but for the hope of profit under the patent law; but the evidence is even more abundant that the aid of capital and business skill for the immediate development of inventions can be secured only under the protection of the patent law.

It needs no proof that the inventions which have been made in this country have contributed greatly to the increase of its wealth, though it would be wholly impossible to estimate what share in the increase should be credited to them. But the accumulation of wealth is not the sole object of society, and there are those who contend that the increase of wealth during the past century has been attended with a relatively greater increase of poverty. They contend, and probably believe, that the net result of

the introduction of modern improvements in the industrial arts has been to injure society and not to improve it, and that the great mass of men have not been made happier and better by them.

A humble example will show whether it is the inventor or the public that receives the greatest benefit from an invention. Many persons not yet old will remember when the weekly washing of the clothing of the families of the country involved as its most laborious part the wringing of the garments by hand. Some person invented the wringing machine, in which the garments were passed between elastic rolls by turning a crank. The invention went into general use, and the patent proved a profitable one. Now, if the wives of the laboring men of this country were asked to name a price at which they would give up the use of this humble implement, can any one suppose that they would agree to do it for a hundred times the profit derived from the patent by the owners? There is not a house in the land the daily labor of which is not lighter than it would otherwise be by reason of inventions which are never thought of by those who entertain most positively the opinion that the great mass of the people have gained nothing from the inventions of this century. The truth is directly the reverse. No invention can yield a fortune to those who bring it into use unless directly or indirectly it ministers to the well-being of a multitude of men; and no multitude of men will adopt an invention unless they can see that they will in some way be the gainers thereby. The universal wants of men are food, clothing, shelter, and fuel. As to the necessity of supplying them, there is no difference between the rich and the poor; and it is to the supply of these common wants that the labors of inventors have been most persistently directed. There are many inventions the direct and immediate purpose of which is to enable those who perform physical labor to satisfy their daily wants with less exer-

tion and fatigue than by old methods or instruments, or with less exposure to hurtful conditions and surroundings. The reaping and mowing machines, the improved ploughs and harrows, the seed-planting and sowing machines, the sewing machines and improved kitchen utensils, the stoves and furnaces, the waterproof rubber coats and boots, do this for the farmer and his family, the greater part of whose labor is expended on that which he raises for his own consumption.

Remarkable results have been achieved in the satisfaction of other than physical wants. The general education of the people and the diffusion of knowledge have made their demand upon inventors, and they have met it with signal success. To educate those whose daily toil must through life supply their daily wants, books are required as much as for the education of the rich. It is not highly important to the latter that books should be cheap, but is well-nigh indispensable to the former; and the highest efforts of mechanical genius have been directed to satisfying this requirement. There is no part of a book as it is now made which has not been subjected to the inventors' efforts to cheapen it. Less than a hundred years ago paper was made wholly or almost wholly from rags. The production of rags has long been inadequate to supply the demand, and the world has been searched for new materials. New methods, chemical and mechanical, have been devised for reducing various kinds of grasses and other kinds of fibrous substances to pulp. Trees themselves have been attacked as a source of supply, until the forests of the New England mountains are threatened with annihilation to meet the demands of book-makers for cheap paper. One improvement after another is yearly made in paper-making machinery, and constant improvements are made in the printing machine. All this brings books within the reach of every child to be educated and every man who can read, whether rich or poor. Does any one

imagine that the resources of mechanical skill and genius would be taxed to their utmost, and that millions of dollars would be expended to bring the price of daily papers down to two cents, unless there were a multitude of customers such as the rich could never furnish?

A sanitary improvement may be invented and patented, but it can give no wealth to the owner of the patent unless it be adopted by a multitude of people whose comfort and health are increased by it, and who would not adopt it if it did not do this for them. A few years ago the city of Memphis was subjected to the ravages of yellow fever, due in great measure to its want of proper drainage. The city was aroused by the calamity to a sense of its danger, and introduced an improved system of drainage, unknown a few years before, with the result that it has become one of the healthiest cities of the country. Who have been the greatest gainers from the invention of improvements in sewerage,—the inventors or the communities which have adopted them?

Through inventions such as these, called into existence by the stimulus of the patent law, the moral and intellectual wants of the great mass of men, as well as their physical wants, are supplied as never before, and means for improvement and sources of enjoyment are open to them which otherwise would be the exclusive privilege of the rich. We have but to look at the railroad, the product of a multitude of inventors, which, taken as a whole and in view of its influence upon the conditions of society, is perhaps entitled to rank as the greatest of human inventions, to see that what it does for the rich it does in greater measure relatively for the poor. It transports in this country alone millions of people who work for daily wages, and who but for its existence could never find the money or time to travel. It transports food and clothing over distances which would have shut out both from cheap sources of supply. This is the most striking illustration

of the effect of inventions in supplying the wants of men in all conditions of life at the cheapest rates, and bringing the means of comfort and enjoyment within the reach of constantly increasing numbers. They give to a constantly increasing proportion of men the substantial advantages of wealth by placing within their reach, upon terms with which they can comply, a constantly increasing proportion of those things which heretofore wealth only could command. They have done and are still doing much more than this. A long list could be made up from the records of the Patent Office of things called into existence by inventors and contributing daily to the comfort, well-being, and happiness of rich and poor alike, which no long time ago could not be secured by any one upon any terms.

These are but meagre illustrations of the manner in which inventions promote the welfare of the people at large, but they serve to indicate the conclusion which would be inevitably reached by an exhaustive examination of the histories of the patented inventions of this country. It is true that such a history would show that a great number of the inventions for which patents have been issued have proved to be worthless. If worthless, they are also harmless. Repeated failures in the effort to advance are inevitable. The great highway of human progress is strewn with wrecks of repeated trials in the effort to secure substantial results. The failures are by no means a total loss. They often disclose the conditions of success or indicate the direction in which it lies. It is often as important to know what cannot be done, and why not, as to know what can be done. The patent law has had the effect of stimulating a spirit of inquiry into the secrets of nature, which is as truly scientific in its methods and objects as any intellectual work which the world has ever known. Not the least of the benefits of the patent law to the country is the body of trained

observers and experimenters which it has called into existence among the laboring men of the country.

This article cannot be better brought to a close than by an extract from the annual report made at the beginning of this year by the present accomplished Commissioner of Patents :—

The place of the Patent Office among governmental agencies is as unique as it is important. It is concerned neither with the collection nor the expenditure of the ordinary public revenues. Unobtrusive and unsensational in its work and methods, it asks nothing of the Treasury excepting moneys which its patrons contribute, and nothing of Congress excepting measures to secure its highest efficiency. As it enters upon the second century of the system which it administers, the distrust which has existed to some extent of its functions has happily passed away. The triumphs of American invention have attracted universal admiration, and the conspicuous demonstration of their importance and usefulness has turned distrust to confidence. I verily believe that no law or legal system in any age or any land has ever wrought so much wealth, furnished so much labor for human hands, or bestowed so much material blessing in every way as the American patent system.

The justice of this estimate of the value of the patent system of this country will not be doubted by those who study its workings most carefully. Such students will find its greatest results not in the achievements which strike the imagination most forcibly or have left their record in great fortunes, but in the multitude of minor inventions which have invaded every household, farm, and workshop, making labor lighter and more efficient, increasing the comforts of life, and bringing into the humblest homes a multitude of things contributing to health and happiness which not many years ago would have been ranked among the luxuries of the rich or were wholly beyond the reach of rich and poor alike.

CHAUNCEY SMITH.